CLAIMS

1. An optical switching/routing system comprising:
a first opto-electronic assembly, a router assembly, a second opto-electronic assembly and a redirecting sub-system optically interposed between said router assembly and said second opto-electronic assembly;

said first opto-electronic assembly being capable of receiving a first plurality of individual beams of electromagnetic radiation, and of emitting a second plurality of individual beams of electromagnetic radiation;

said router assembly being capable of receiving said second plurality of individual beams of electromagnetic radiation, and of directing each of said individual beams from said second plurality of individual beams respectively to a preselected location on said redirecting sub-system;

said redirecting sub-system being capable of receiving each of said individual beams from said second plurality of individual beams and providing a plurality of redirected outputs to said second opto-electronic assembly; and,

said second opto-electronic assembly being capable of receiving said plurality of redirected outputs and of emitting a third plurality of individual beams of electromagnetic radiation.

2. The system of claim 1 wherein said first opto-electronic assembly comprises at least one module having a detector, and a laser.

3. The system of claim 2 wherein said laser is a vertical cavity surface emitting laser.

4. The system of claim 2 wherein said first opto-electronic assembly further comprises an amplifier.

5. The system of claim 2 wherein said first opto-electronic assembly further comprises circuits capable of modifying an electrical output of said detector.

6. The system of claim 1 wherein said first plurality of individual beams of electromagnetic radiation includes beams of at least two different center wavelengths and each beam of said second plurality of individual beams has substantially a same center wavelength and substantially a same polarization.

7. The system of claim 6 wherein said third plurality of individual beams of electromagnetic radiation includes beams of at least two different center wavelengths.

8. The system of claim 1 wherein said first router assembly comprises at least one element selected from the group consisting of a switchable diffractive element, a switchable diffractive grating, a switchable liquid crystal element, and a switchable mirror.

9. The system of claim 6 wherein said first router assembly comprises at least one switchable diffractive element; and, wherein said at least one diffractive element is a volume holographic element.

10. The system of claim 1 further comprising cross-talk suppression means optically associated with said router assembly and said redirecting means.

11. The system of claim 1 wherein said redirecting sub-system comprises an optical component.

12. The system of claim 11 wherein said optical component includes at least one microlens.

13. The system of claim 11 wherein said optical component includes at least one pixellated grating.

14. The system of claim 1 wherein said redirecting means comprise an electrical redirecting means.

15. The system of claim 14 wherein said electrical redirecting means comprise at least one stripe radiation detector.

16. The system of claim 14 wherein said electrical redirecting means comprise at least one array of radiation detectors.

17. The system of claim 16 wherein at least one detector from the at least one array of radiation detectors is capable of being selectively activated.

18. The system of claim 1 wherein said second opto-electronic assembly comprises at least one module having a detector and a laser.

19. The system of claim 18 wherein said second opto-electronic assembly further comprises circuits capable of modifying an electrical output of the detector.

20. A method for switching/routing optical beams comprising the steps of:
receiving a first plurality of individual beams of electromagnetic radiation at a first opto-electronic assembly;
emitting a second plurality of individual beams of electromagnetic radiation from said first opto-electronic assembly;
receiving said second plurality of individual beams of electromagnetic radiation at a switching/routing assembly;
switching/routing each beam from said second plurality of individual beams to a preselected location;

redirecting said second plurality of individual beams, after switching/routing each beam from said second plurality of individual beams to the preselected location, to a second opto-electronic assembly;
receiving said second plurality of individual beams of electromagnetic radiation at said second opto-electronic assembly;
emitting, from said second opto-electronic assembly, a third plurality of individual beams of electromagnetic radiation.

21. The method of claim 20 further comprising the step of:
reducing noise in the switching/routing and redirection of said second plurality of individual beams.

22. A method for switching and routing optical beams comprising the steps of:
receiving a first plurality of individual beams of electromagnetic radiation at a first opto-electronic assembly wherein said first plurality of individual beams of electromagnetic radiation includes beams of at least two different center wavelengths;

emitting a second plurality of individual beams of electromagnetic radiation from said first opto-electronic assembly wherein each beam of said second plurality of individual beams has substantially a same characteristic, said same characteristic being selected from a group consisting of center wavelength, polarization, and center wavelength and polarization;

receiving said second plurality of individual beams of electromagnetic radiation at a router assembly;

routing each beam from said second plurality of individual beams to a preselected location;

redirecting said second plurality of individual beams, after routing each beam from said second plurality of individual

beams to the preselected location, to a second opto-electronic assembly;

receiving said second plurality of individual beams of electromagnetic radiation at said second opto-electronic assembly;

emitting, from said second opto-electronic assembly, a third plurality of individual beams of electromagnetic radiation.

23. The method of claim 22 wherein said third plurality of individual beams of electromagnetic radiation including beams of at least two different center wavelengths.

24. The method of claim 22 further comprising the step of: reducing noise in the routing and redirection of said second plurality of individual beams.

25. The method of claim 20 wherein said second plurality of individual beams of electromagnetic radiation has substantially a same polarization.